

March 2005 IDS Report

Steve Thorsett

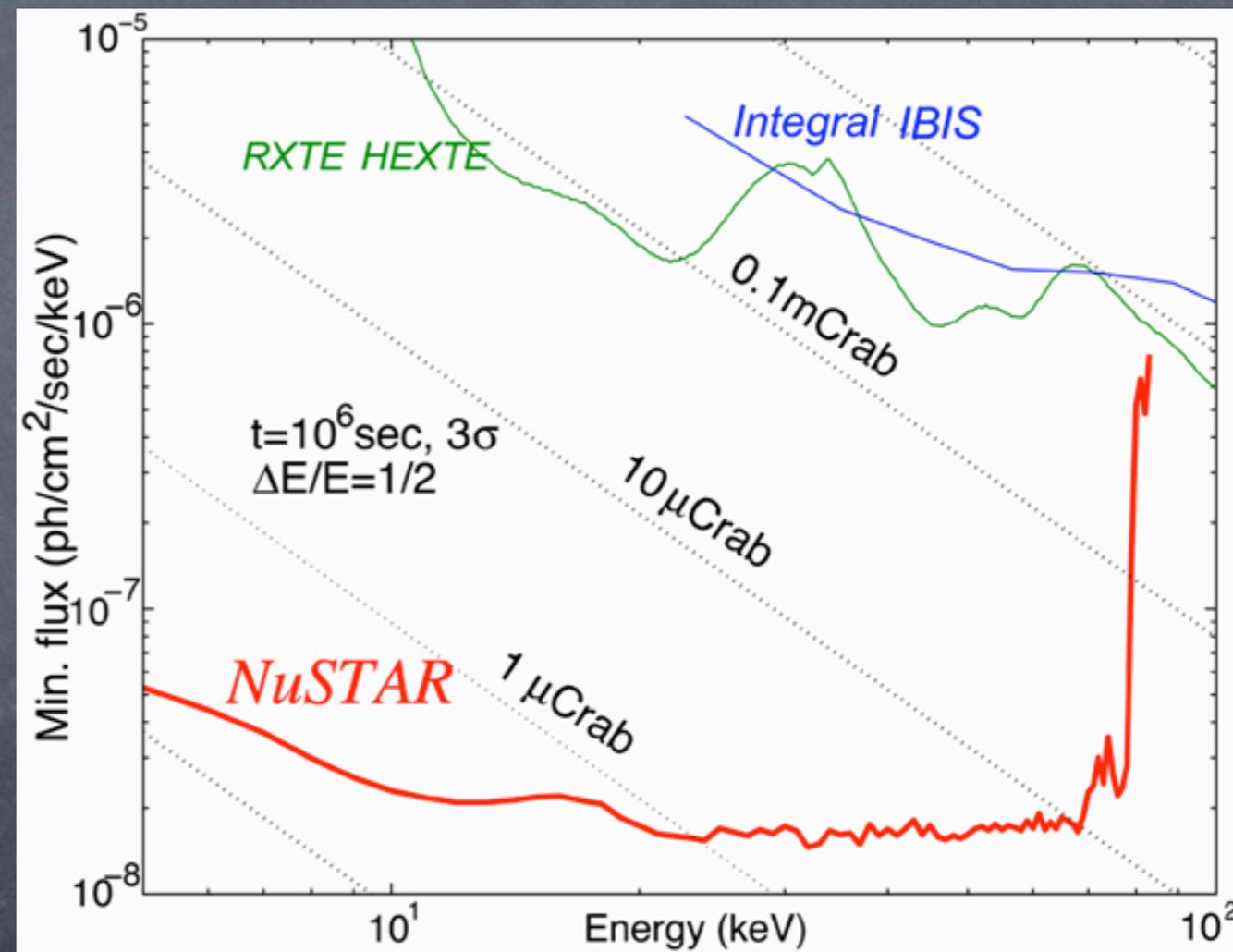
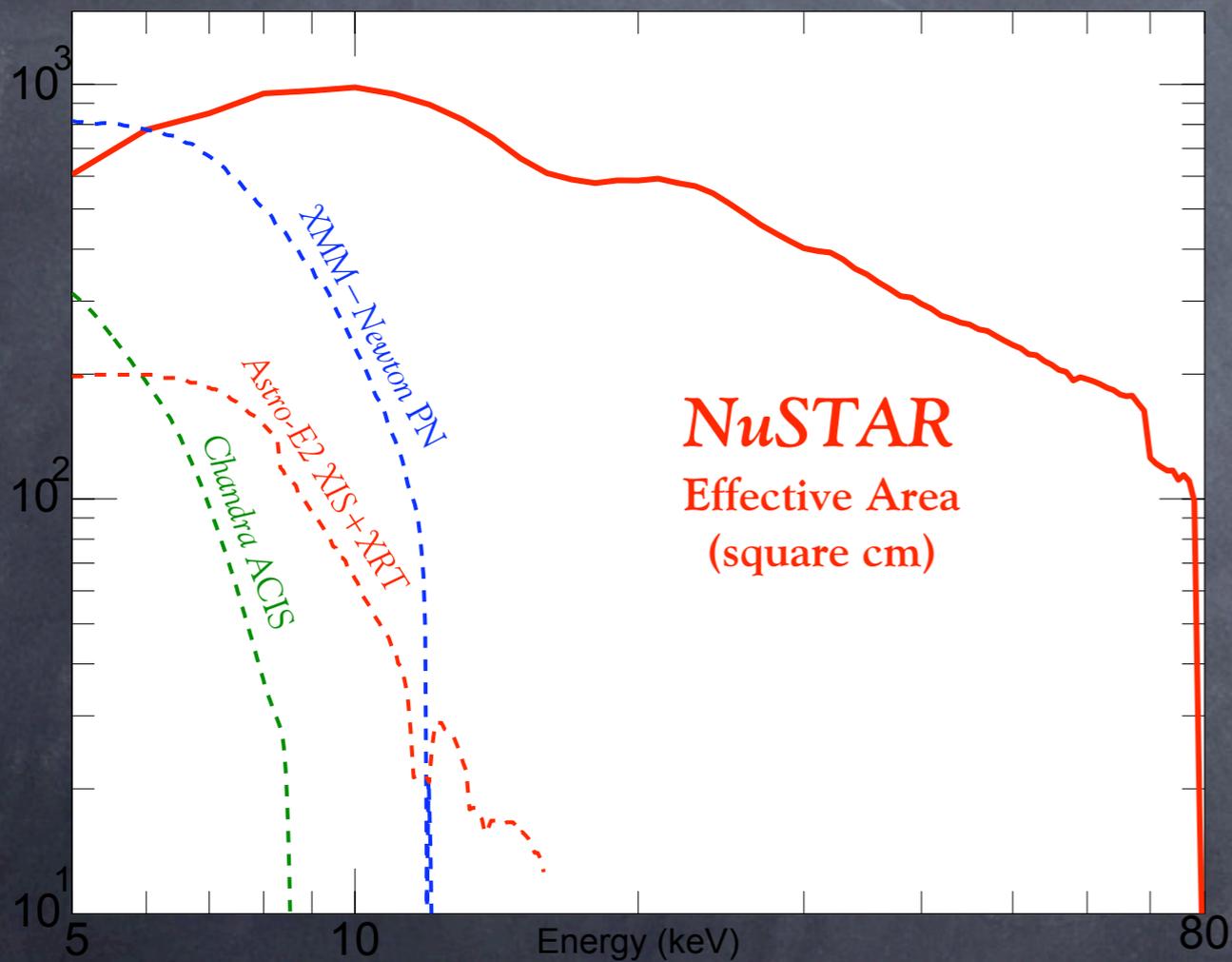
New contact information

- Temporarily taking on duties of Dean of Physical and Biological Sciences (probably roughly through end of 2005)
- New phone: 831-459-2931
- Can continue to use current mailing address

NuSTAR developments

- Chosen in late January for non-competitive extended Phase A
- Now working together with NASA on a few key studies (balloon flight, engineering models, ...)
- Flight confirmation review in early 2006, followed almost immediately by instr PDR
- Nominal launch date early 2009

Reminder of key capabilities:

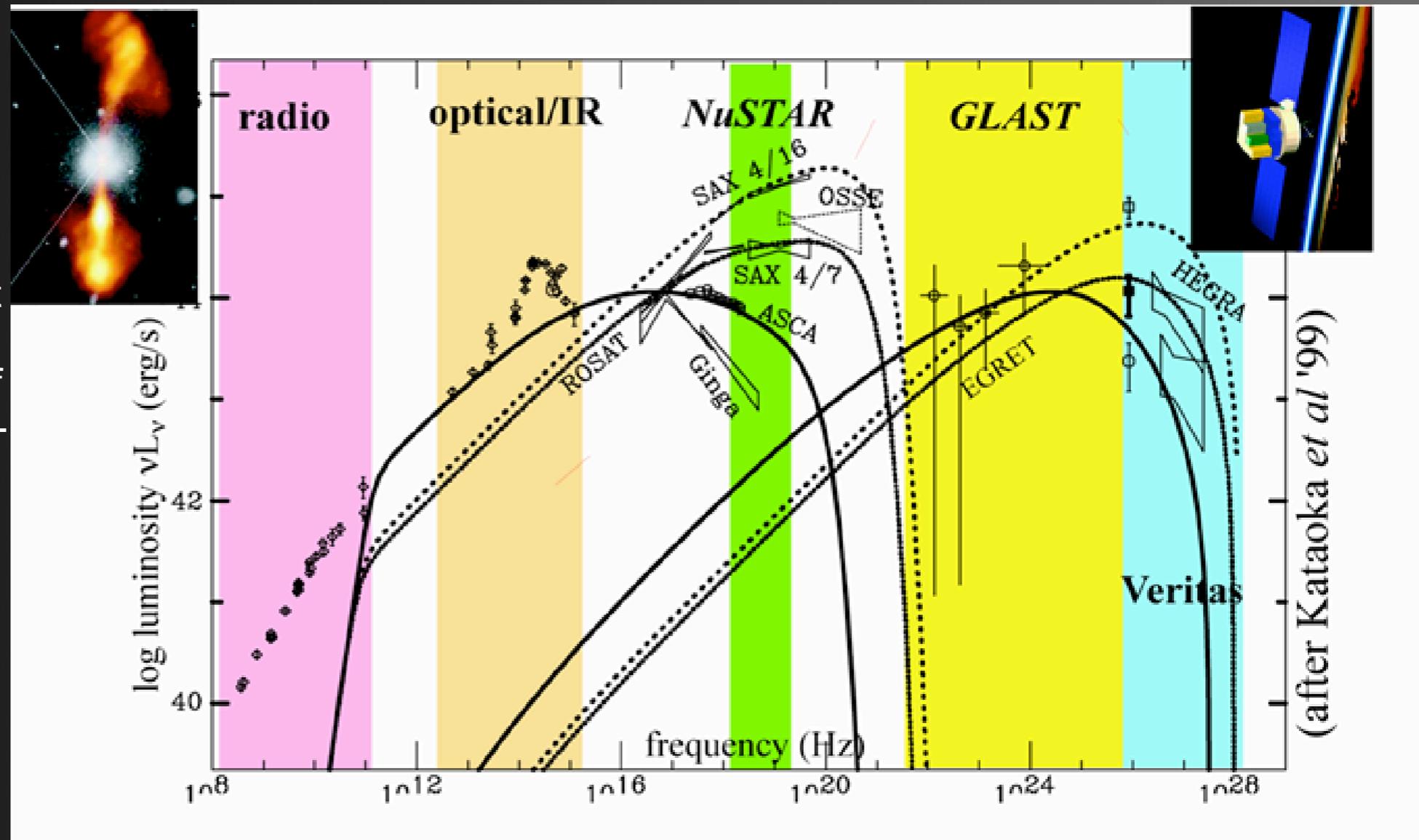


Importance to GLAST

- “a timely, synergistic partner to GLAST, exploring the most extreme environments in the Universe.”
- localization of GLAST unidentified sources
- followup of a few GLAST GRBs (post Swift) and other GLAST-identified ToO's

Key Science Overlaps with GLAST

NuSTAR will test our understanding of all types of black-hole powered active galaxies



GLAST's measurements of Compton radiation in the blazar Markarian 501 are compromised without NuSTAR's simultaneous measurements of the time variable synchrotron peak (SSC model is shown). Together, they strongly constrain physical models.

Nominal blazar plan

- NuSTAR and Veritas/HESS are pointed, GLAST's need/plan for pointing less clear
- TeV blazars: 10–14 day campaigns constrained by Cerenkov telescope moon constraints; probe variability to hour scales
- Less extreme “GeV” blazars will be monitored round-robin over longer periods
- 3 months minimum allocated by NuSTAR

Arecibo multibeam pulsar survey status

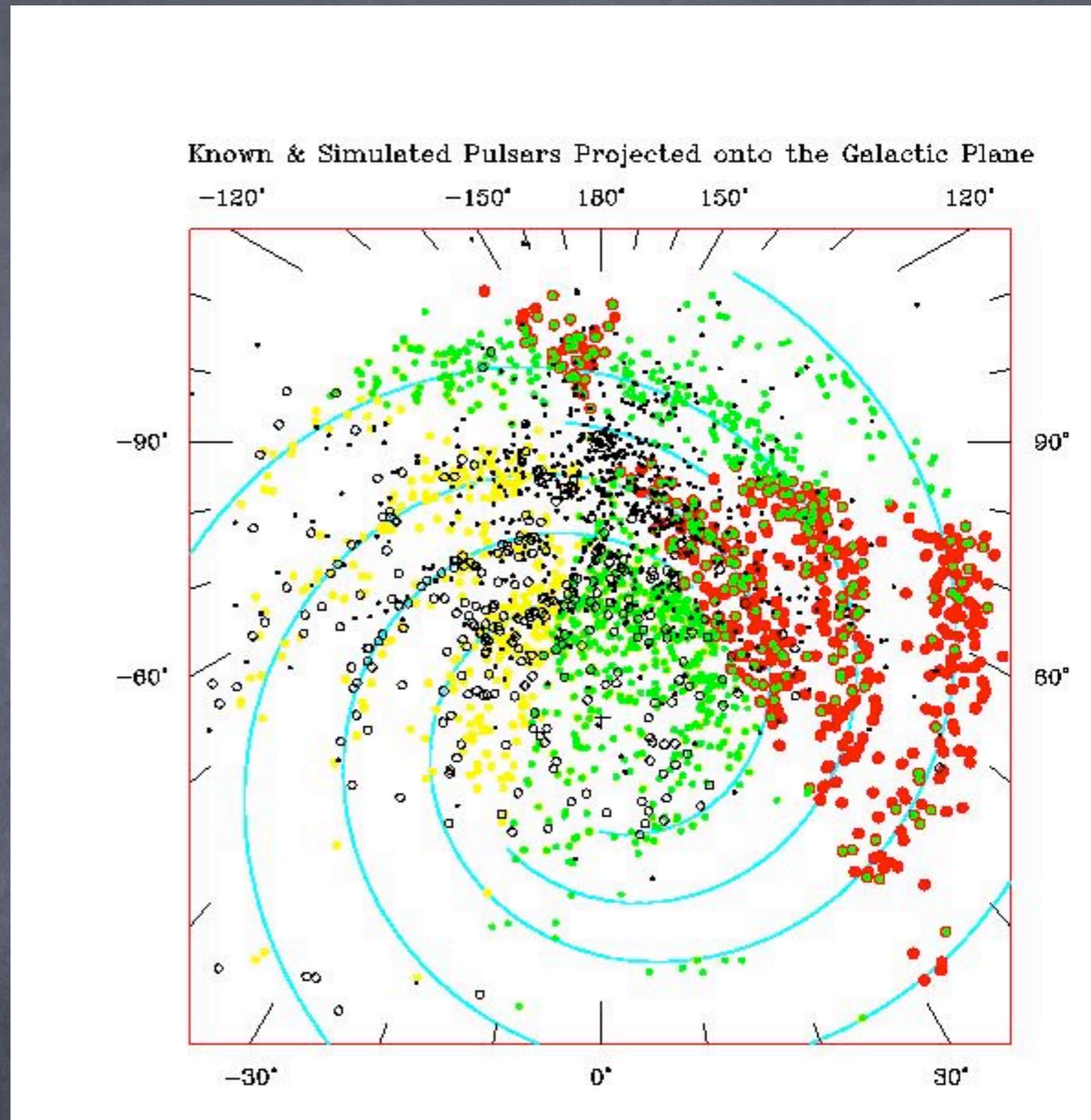
- ◉ Reminder: this will be the dominant source of new pulsar discoveries before GLAST
- ◉ My own participation in the PALFA consortium is currently primarily as spectator/supporter, though I plan to be more active in the multiwavelength and interferometric followup phases

Observations

- Plan is to concentrate first on Galactic plane, where high frequency gives the greatest advantage over previous surveys
- Long term plan to cover most of Arecibo sky, over five year period (using ~5% of Arecibo schedule + comparable amount for followup)
- So far, about 40 sq deg covered (in about 60 hours of obs)
- 28 known pulsars and 11 new ones

Projection onto the Galactic plane of L-band survey pulsars.

- Open circles: Parkes Multibeam pulsars (from public catalog).
- Black dots: Pulsars from the Princeton Catalog.
- Red dots: simulated AO detections (400 MHz, 300 s, 1024 ch).
- Green dots: simulated GBT detections (400 MHz, 600s, 1024 ch).
- Yellow dots: simulated Parkes MB detections (280 MHz, 2100 s, 96 ch).
- Spiral arms: spiral arm definitions used in new electron-density model (NE2001, Cordes & Lazio, astro-ph/0207156; [NE2001 papers & code](#)).
- Assumed birth rate = $1 / (167 \text{ yr})$



from Jim Cordes

Status

- Proposal for next year has received high ratings, but as a large project it is awaiting skeptical review panel
- Initial paper is in draft form
- On track to discover ~1000 new pulsars on an "interesting" timescale for GLAST (a roughly 60% increase, and including Parkes contributing to more than tripling the pre-EGRET numbers)

Upcoming

- For an Aug 07 launch, we are looking for a roughly Aug 06 date of coordinated timing observations (ramping up for full-scale timing a few months before launch)
- With that timeline now fixed, we'll work to
 - evaluate coverage with already planned timing programs
 - identify any key targets that need separate planning
- Given launch delays, I expect to defer a new IDS funding request